U. S. DEPARTMENT OF AGRICULUTRE
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TRADE REACTION TO WINTER PEARS PACKED IN FIBERBOARD BOXES

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INTRODUCTION

Packaging research specialists of the Agricultural Marketing Service were requested by the Oregon-Washington-California Pear Bureau to evaluate the trade reaction, both at wholesale and retail, to pears packed in experimental fiberboard containers during the 1953-54 marketing season.

The design of the containers, as well as all work of packaging and shipping the pears in them was undertaken by the Pear Bureau in cooperation with the manufacturers of the experimental containers. The performance of these containers from the standpoint of packing, storage and shipping, and the condition of the pears shipped were evaluated by pear shippers, representatives of container manufacturers, representatives of the Pear Bureau, and private or public inspection services. Packaging research specialists of the Department examined most of the shipments upon arrival at terminal markets, and observed the condition of the containers and the trade reaction to the pears in the terminal markets and in various wholesale and retail stores.

Briefly, the results of these observations are as follows:

1. Most of the wholesalers who inspected and appraised the pears packed in experimental fiberboard shipping containers were quite favorably impressed with the container's ability to minimize injury to the fruit.

2. Many wholesalers were apprehensive over the stacking and trucking capabilities of the fiberboard boxes.

3. There was general disapproval of the slackness of pack prevalent in most of the containers.

4. Many wholesalers suggested that additional work be directed toward improving the labeling and appearance of the package.

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5. In general, the retailers' reaction to the fiberboard container was quite favorable. They did not consider slackness of pack or unattractiveness of the containers as important problems and, on the other hand, the retailers were pleased with the performance of the experimental containers in reducing injury to the pears.

6. As a rule, auction market buyers discounted the pears packed in the experimental fiberboard boxes, although in some instances they paid as much or more for them as for comparable pears packed in standard wood boxes.

Approximately 10,000 experimental fiberboard boxes of pears were shipped under this container research program 1/ of the Pear Bureau. These shipments were made between October 1953 and April 1954, and they ranged all the way from a part of a car containing 75 packages to a full car of more than 800 packages. A total of 29 shipments was made, and of these, Department container specialists observed 12 shipments, representing about 67 percent of the total volume shipped in the experiment. Seventeen of the 29 shipments were sold in 6 auction markets and the remaining 12 were distributed directly to chain store warehouses. An effort was made to examine a few of the experimental containers from each test shipment in wholesale houses and retail stores in order to follow up on the performance and suitability of the containers. Comments with respect to the trade reaction were expressed by some 66 wholesalers and 32 retailers.

Appearance and Condition of the Containers in Terminal Markets

In general, the over-all appearance of the fiberboard boxes packed with pears was comparatively unattractive because of considerable minor damage, such as bulging, creasing, crushing, scarring of the containers, and scarred or defaced labels; and, perhaps more important, the pack was usually slack from 1/2 to 2 inches. The slack pack, in contrast to the well-known hump or bulge pack associated with wood boxes, was undoubtedly the chief factor in minimizing sales appeal and general attractiveness of the fiberboard boxes. On the other hand, few people questioned the merits of the fiberboard box with respect to its doing a good job of protecting the pears--box cuts were eliminated and pressure bruising was apparently reduced. Most of the experimental boxes were printed with the words "Medford pears" or "Northwest pears," and in many instances packers attached their own labels

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1/ The purpose of this research was to develop cheaper and improved containers for pears. Two of the principal advantages of fiberboard as compared to wood are (1) lower cost and (2) less weight. Figures supplied by pear industry sources reveal that, based on a cost of 32 to 35 cents for a corrugated fiberboard box, total packing costs can be cut by about 15 cents. In addition, it was estimated that a freight saving of 6 cents per package can be realized if fiberboard containers are used in lieu of standard wood boxes (based on a $2 per cwt. rate to Chicago). The fiberboard container weighs roughly 3 pounds less than the standard wood box.

to the boxes. Presumably, these fiberboard containers would be more attractively printed with individual brand identification if they were generally used by individual shippers.

Five types of fiberboard boxes were observed: (1) Double-wall; (2) single-wall with a full liner; (3) single-wall with a U-liner on two sides and bottom; (4) single-wall with double-wall liner on four sides and bottom; and (5) single-wall with cell dividers. The double-wall box and the single-wall box with double-wall liner appeared to be the most substantial of the five types. The single-wall fiberboard box with cell dividers, which was observed in only one shipment, showed more corner crushing than the other types. However, no extensive, serious container failure was noted in any of the test shipments. Generally speaking, the containers appeared to protect the pears satisfactorily. It was noted, however, that when the containers were stacked too high, seven or eight boxes deep, the lower containers tended to bulge. Corner crushing, which was infrequent, probably was due to shifting of the load in transit, forcing the containers out of alignment. Tops of the containers were usually depressed because of the slackness of the pack. Creasing caused by contact of the containers in the car with wood containers or with carloading strips was noted in some shipments, although no significant damage was apparent to the pears within such creased containers. The most prevalent type of damage, affecting the over-all appearance of the containers, was the scratching or scarring of the containers or the labels. Apparently, the packers' labels were frequently pasted on the container just before loading the car, causing the labels to stick to adjacent boxes. However, several shipments arrived in excellent condition and the over-all appearance of the containers in those shipments was considered excellent by most observers in terminal markets.

As would be expected, produce buyers and wholesalers were somewhat apprehensive over the ability of the containers to stack and withstand the usual rough handling involved in loading, unloading, and transporting produce from the terminal market to the retail stores. The following comments were made by various potential buyers or wholesalers in terminal markets, and many of them indicate some apprehension concerning the sturdiness of the containers:

"Can't ship this package by truck--will collapse."
"Cartons won't hold up in truck transit."
"Perhaps packages won't hold up in transit."
"Cartons held up good from B. & O. Terminal through warehouse to stores. We like to handle cartons."
"Cartons won't hold up through warehouse to stores."
"We can't handle cartons very well because of our system of palletizing in warehouse, one loaded fork-lifted pallet on top of another."
"Cartons won't store as well as wood."
"Not strong enough for storage and handling."
"Afraid of poor stacking strength."
"Would not truck well--not strong enough."

"Stacked 7 to 9 high in cooler."
"Need reinforcing at corners."
"The carton is larger than the box--takes up too much space--is too bulky."
"Bigger box (carton) appeals to customers--takes up a lot of space."
"Prefer wood to cardboard--holds weight better--stronger."
"Prefer boxes over cartons, stack better in warehouse and store."
"Won't stack if wet, otherwise I like cartons."
"No good for stacking."
"No good for jobber--carton bends--needs wood supports at corners."
"Won't stack properly under much handling--we use pallets in warehouse."
"Carton rides fairly well and will hold up in storage."
"Sloppy, inadequate package--can't stand traveling."
"Don't like handling and trucking fruit in cartons--require special loading and handling."
"The cartons appeared weak on the handtrucks and ... the bottoms should be stronger."
"No good for export. I have a lot of out-of-town business and don't dare truck cartons too far."
"Afraid of not being able to stack the carton."
"I don't think they'll ship."
"The carton is hard to handle--can't get a grip on it."
"Should be stacked criss-cross, will support packages better--have stacked cartons of apples 9-high."
"If the carton gets wet in the icebox, the bottom may fall out."
"May be trouble when carton gets wet."
"I'm afraid that if fruit sweats, it might weaken the box."
"Because we keep pears in the refrigerator, we have trouble stacking cartons high enough to conserve space. This is a common warehouse problem."
"Cartons may not hold up on corners where hit by handtrucks."

Even though the wholesale trade expressed lack of confidence in the ability of containers to stand up in the terminal markets, observations of the performance of the containers in wholesale stores and retail stores, by Departmental container specialists, failed to produce any tangible evidence of inability of these containers to withstand normal commercial handling. However, it is possible that these experimental containers were handled more carefully than wood boxes would have been handled.

Effect of the Fiberboard Boxes in Protecting the Pears

Although the general reaction of the wholesale trade to the fiberboard containers for pears might be summed up as one of skepticism, the reaction in regard to the ability of the box to protect the pears from bruising or injury was almost unanimously favorable. It was an extremely rare occurrence

when a prospective buyer could find any evidence of container failure causing pressure bruising or damage to the pears. Although there were exceptions, most of the comments heard in the terminal markets concerning the ability or capacity of the containers to minimize fruit injury were favorable, as can be seen in the following comments:

"Carton will save a lot of bruising."
"Definite advantage to fruit on bruising."
"Loose package (carton) may result in additional bruising with handling to retail outlet."
"Pears may come through in better shape."
"Cartons can stand more shock than boxes with less injury to pears."
"Fruit in cartons better than wood--pears in fine condition."
"Don't think pears will bruise as much in cell-pack carton."
"Not as much bruising of the fruit."
"Not as much bruising."
"The cell-carton is a very good package and prevents a lot of bruising."
"Like carton very much--prevents bruising."
"Think pears in cartons better than boxes--don't bruise as much."
"Carton minimizes bruising, package has 'give,' yields under pressure more than wood box."
"Less bruising in cartons."
"No question--carton prevents bruising."
"Cartons O.K. if no decay, but decay spreads faster in cartons."
"Do they eliminate bruising?"
"Decay spreads faster in cartons because no air gets in."
"Usually much less bruising."
"Remarkably free of bruising."
"Think pears will bruise easily--roll a lot in carton."
"Skeptical of cartons because pears bruise very easily."
"Pears don't bruise in cardboard."
"We're more careful with fruit in cartons."
"Pears don't keep as good in cartons."
"I like cartons better, fruit doesn't get bruised as much. In wood I find more bruising. The carton expands a little."
"Very nice package--pears won't bruise."

Many fruit handlers were afraid of the possible adverse effects due to the lack of adequate ventilation in fiberboard cartons and many were afraid that decay, if present, would spread faster in such containers or that the fiberboard might burn the fruit. On the whole, however, the experimental fiberboard boxes appeared to reduce bruising below that found in the standard wooden box.

Salability of the Pears in Fiberboard Boxes in Terminal Markets

One way to evaluate the trade acceptance of new containers is to compare the prices paid for the product packed in the experimental container with those for comparable products packed in conventional containers. In some test shipments there were no comparable pears sold in conventional containers. However, the salability of the pears packed in experimental containers was compared with similar grades, sizes, and varieties of pears packaged in standard wood boxes. There was a wide range of price differentials between the pears packed in experimental containers and those packed in standard containers (appendix table 1).

With the exception of sales at the New York auction, pears packed in experimental fiberboard containers were not severely discounted in most terminal markets. Price comparisons of pears of the same grade, size, and variety revealed that in the four auction markets, New York, Philadelphia, Pittsburgh, and Detroit, a simple average of the price differentials for each market amounted to about 19 cents per package in favor of pears packed in standard wood boxes.

In New York, pears packed in experimental fiberboard containers were heavily discounted, the price differential averaging 78 cents and exceeding a dollar in a few cases. In most instances, even low-grade pears packed in wood boxes brought a higher price on the New York auction than better-grade fruit packed in fiberboard.

In both Philadelphia and Pittsburgh, the trade reacted somewhat more favorably to pears packed in experimental containers. Philadelphia buyers paid, on the average, about 23 cents more for pears packed in standard wood boxes than for comparable fruit packed in fiberboard boxes. The only price comparison available at the Pittsburgh auction showed that pears packed in fiberboard brought 10 cents less than pears of like quality from the same car packed in wood boxes.

In Detroit, the only other market for which comparable data are available, pears packed in fiberboard containers commanded an average premium of 34 cents a package over pears packed in standard wood boxes.

As a general rule, Oregon pears brought higher prices than comparable fruit from Washington State packed in the same type of container. Also, pears packed in the experimental fiberboard containers with a film liner were not so severely discounted, even when compared to standard wood boxes with film liners, as were pears in packages without film liners.

In some test shipments, it will be noted, pears packed in experimental containers sold for higher prices than comparable pears packed in standard boxes. However, there was usually some special reason for this. In one test shipment, for example, the pears packed in fiberboard boxes commanded a higher market than did other pears sold on the same day, but the pears were not strictly comparable. In many other shipments, where the pears packed in experimental containers seemed to be of comparable condition and

quality to pears packed in wood containers, the cartons were discounted from a few cents to more than a dollar a package. One obvious reason for this is the fact that they were experimental containers. Most experimental containers are subject to price discounts because of the unwillingness of many buyers to take the chance of trying out an experimental package until they have seen others try it and have observed its general performance. For this reason, it may take several years to develop a new container that will command generally favorable trade acceptance.

Comments by the wholesale trade on the general appearance and sales appeal of the fiberboard boxes are as follows:

"Package needs color--ugly, unattractive package--no color contrast with (between color of carton and fruit) Bosc."
"Thought orange and blue label made more attractive package."
"Poor in appearance."
"Not sold on cartons--don't have good appearance of boxes."
"Pack looks bad--slack."
"Slack pack makes it look unattractive."
"Package O.K.--some uneven or irregular sizing."
"Bigger box appeals to customers."
"This carton is a very good package but needs dressing up. Should wrap 3 or 4 pears in top layer in different colored papers like Golden Delicious to make more attractive display for retail customers."
"Carton has no sales appearance."
"Carton looks dull alongside wood."
"Package has no sales appearance."
"Cartons look poor--matter of coloring."
"Once you open the carton for display, you can't close it satisfactorily."
"I prefer the wood box, this pack is slack."
"I prefer wood. Fruit looks better in wood. Looks messy in carton even though it isn't."

Retailer Reaction to Pears Packed in Experimental Containers

Retailers were quite open-minded in their appraisal of the fiberboard boxes as containers for pears. Frequently, a retailer expressed his preference for fiberboard boxes for citrus or lettuce, and his previous experience seemed to carry over into his appraisal of fiberboard containers for pears. Comments by retailers are as follows:

"No injury to pears arriving in cartons."
"Favorably impressed with cartons' ability to minimize injury and bruising."
"It makes no particular difference to me as to the type of container as long as the fruit arrived in good condition. These Boscs had suffered no injury because of container failure."

"Somewhat slack in pack in carton; don't bruise, scratch, or cut up in cartons."
"Less injury to pears because there is no bulge."
"Very good, firm and sound."
"Loose pack may have tendency to bruise pears--cell dividers will prevent spread of rot."
"Fruit looks very good with no bruising. Cell-pack reduces injury to fruit."
"Very nice pears with no bruises. In favor of cartons. No damage to cartons or fruit."
"Cartons are better than wood boxes because of less bruising."
"The fruit was in very good condition."
"Compared with fruit packed in standard boxes in the same car, remarkably free of bruising."
"Fruit in good condition--complete lack of any type of bruising."
"Smother in cartons and shrivel quicker."
"Fruit in cartons usually bruise less than in wood boxes. The pears, however, have some bruising because of slack pack."
"More bruising in cartons."
"Cartons held up very well at store."
"Prefer carton--easier to open--doesn't require a hammer."
"Although I could find no fault with cartons, I prefer wood boxes."
"No nails to cause injury or damage."
"Easier to handle cartons--no nails to get hurt."
"Box (carton) keeps fruit cool--strong enough."
"Cartons are O.K., except they aren't quite as sturdy as wood."
"Carton easier to handle, especially for women--won't stack well in cooler--takes up too much space."
"Easier to handle carton, otherwise not much difference."
"I displayed pears without realizing they were packed in a carton."
"Like wood better than paper. Paper didn't hold up too well from auction (Philadelphia) to store in Scranton."
"Can't take rough treatment wood can. Must be careful when pears are conditioned. Carton is good when pears are green and firm."
"Cartons arrived (in Washington, D. C.) from Philadelphia in good condition. Difficult to stack cartons, prefer to handle wood boxes during damp weather. Cartons absorb moisture and may collapse."
"Usually prefer to handle the standard wood box but I am reserving further judgment on the cartons until the pears have been sold."
"Lack of 'shiners' (nails) cutting the help (employees), general ease in handling."
"Cartons easier to handle."

"Easier to open cartons--no nails to worry about."
"Store managers and personnel prefer to handle cardboard."
"Less waste this year than ever before. Poly liner keeps pears in very good condition. Cartons held up well in truck from auction. These are the first cartons of pears we've handled."
"Box is in good shape. I think carton is pretty good."
"I'm very favorably impressed with the poly liners."
(This retailer had no comment regarding cartons.)
"I like wood better, carton may get wet in the cooler. May have trouble stacking high."
"I like either wood or paper as long as there's no bruising."

Appendix table 1.--Average auction market prices of winter pears packed in experimental fiberboard boxes compared to prices of similar sizes and varieties of pears packed in standard wood boxes, 4 terminal markets, October 1953-April 1954

Date of sale	Experimental fiberboard boxes: Origin	Grade	Price 1/	Standard wood boxes: Origin	Grade	Price 1/	Price differentials
			Dollars			Dollars	Dollars
			Detroit				
12/17/53	Cashmere, Wash.	Ex Fcy	4.25	Wenatchee, Wash.	Ex Fcy	4.35	-.10
12/18	do	do	4.25	do	do	4.20	+.05
4/5/54	Medford, Ore.	U.S. 1 (film liner)	5.61	Yakima, Wash.	U.S. 1 (film liner)	5.21	+.40
4/6	do	do	5.88	do	do	4.88	+1.00
Average	-	-	-	-	-	-	+.34
			New York				
11/2/53	Medford, Ore.	U.S. 1	3.78	Medford, Ore.	U.S. 1	4.60	-.82
do	do	do	do	do	do	4.54	-.76
do	do	do	do	do	do	4.45	-.67
do	do	do	do	do	do	4.59	-.81
do	do	do	do	do	do	4.25	-.47
do	do	do	do	Orch. Siding Wash.	do	3.97	-.19
do 2/	do	do	3.75	Medford, Ore.	do	3.94	-.19
1/18/54 3/	Hood River, Ore.	do	3.36	do	do	4.65	-1.29
do	do	do	do	do	do	4.63	-1.27
do	do	do	3.64	do	do	4.66	-1.02
do	do	do	do	do	do	4.63	-.99
1/25	do	do	3.54	do	do	4.70	-1.16
do	do	do	do	do	do	4.64	-1.10
do	do	do	do	Van Horn, Ore.	do	3.80	-.26
1/27	do	do	3.53	Medford, Ore.	do	4.29	-.76
Average	-	-	-	-	-	-	-.78
			Philadelphia				
10/29/53	Medford, Ore.	U.S. 1	3.62	Orch. Siding, Wash.	U.S. 1	3.33	+.29
11/2 2/	do	do	3.57 4/	Medford, Ore.	do	3.68 4/	-.11
do	do	do	do 4/	do	do	4.09 4/	-.52

Appendix table 1.--Average auction market prices of winter pears packed in experimental fiberboard boxes compared to prices of similar sizes and varieties of pears packed in standard wood boxes, 4 terminal markets, October 1953-April 1954--Continued

Date of sale	Experimental fiberboard boxes: Origin	Grade	Price 1/	Standard wood boxes: Origin	Grade	Price 1/	Price differentials
			Dollars			Dollars	Dollars
			Philadelphia (cont'd)				
1/7/54	Peshastin, Wash.	Ex Fcy	4.45	____, Wash.	Ex Fcy	4.19	+.26
1/11	do	do	4.37	____, Wash.	do	4.29	+.08
1/18/54	do	do	3.94	Peshastin, Wash.	do	4.90	-.96
do	do	do	do	Underwood, Wash.	do	4.69	-.75
1/20	do	do	4.75	Peshastin, Wash.	do	5.22	-.47
do	do	do	do	do	do	4.98	-.23
do	do	do	do	Underwood, Wash.	do	4.64	+.11
Average	-	-	-	-	-	-	-.23
			Pittsburgh				
2/1/54 2/	Yakima,	Ex Fcy	3.80	Yakima, Wash.	Ex Fcy	3.90	-.10
Simple average, 4 terminal markets							-.19

1/ Each price shown in this table is a simple average of auction market catalog line prices and is compared to the price listed opposite it on the same line in order to determine the price differential. Each average price listed under "Standard wood boxes" is compared to an average of prices paid for pears of the same grade, size, and variety packed in fiberboard boxes and sold the same day. Each price listed for pears packed in standard wood boxes reflects the average price paid for a different lot (car or part-car) and the number of comparisons shown for a single day depends on the number of different lots of pears of the same grade, size, and variety sold that day.

2/ Experimental containers and standard wood boxes of same brand shipped in same car.

3/ Pears packed in experimental containers sold this date were all from the same car, but each half of the car did not contain the same combination of sizes, and pears were sold as separate lots. The average prices of pears from two other cars (packed in standard wood boxes) were compared with those of each lot of pears packed in experimental boxes, making a total of four comparisons for 1/18/54.

4/ Price paid for pears subjected to conditioning at the terminal.